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then it can with equal force and in the same sense be asserted that the versor i^{2-t} operating upon the multiplier-line α , will by turning it through the angle t (the supplement of $2-t$) produce the multiplicand line; for one follows the other by legitimate analysis. We do not therefore abandon our position, but affirm it; still, we will relieve Hamilton and all others of any responsibility for our conclusion by changing it to the following: —In the multiplication $\alpha\beta = i^{2-t}$, we conceive that the axis i is attached (mechanically) perpendicularly to the multiplier-line (α), and that the versor (i^{2-t}), turns the latter (mechanically) positively through an angle equal to the supplement of the exponent $2-t$, that is, through the angle t , making it coincide with the multiplicand-line (β).

In regard to the matter referred to by Prof. Johnson in the last March No. of the ANALYST, I should have said that a quaternion may be expressed in terms of the four elements *tensor*, *scalar*, *versor*, and *vector*, as was finally shown in my equation (54), p, 127 of the preceding Vol. of the ANALYST, which equation is

$$q = Tq(SUq + VUq).$$

RESPONSE TO A REQUEST, BY THE EDITOR.—We are requested by a subscriber to furnish a solution to the following problem:—

“A conical hay-stack, altitude a and radius of base r , is to be divided horizontally into three equal parts, by weight; if the density of horizontal strata is everywhere proportional to their distance from the vertex, what must be the vertical height of each part?”

Put x = the distance of any horizontal section from the vertex, then will its area be $\pi(rx \div a)^2$; and if we assume the density at the vertex to be unity and the thickness of the horizontal strata to be dx , we shall have for an element of the cone at the distance x from its vertex, $\pi(rx \div a)^2 dx$; therefore, if x be the height of the upper part, we must have

$$\int_0^x \left(\frac{rx}{a}\right)^2 \pi x dx = \frac{1}{3} \int_0^a \left(\frac{rx}{a}\right)^2 \pi x dx;$$

whence we find

$$x = a\left(\frac{1}{3}\right)^{\frac{1}{4}}.$$

And if x = the height of the upper two thirds of the stack we shall find

$$x = a\left(\frac{2}{3}\right)^{\frac{1}{4}}.$$

Hence, the heights of the upper, middle and lower parts must be, respectively, $a\left(\frac{1}{3}\right)^{\frac{1}{4}}$, $a\left[\left(\frac{2}{3}\right)^{\frac{1}{4}} - \left(\frac{1}{3}\right)^{\frac{1}{4}}\right]$, and $a\left[1 - \left(\frac{2}{3}\right)^{\frac{1}{4}}\right]$.

QUERY.—If in the foregoing prob. the density of the strata is supposed to vary as the superincumbent weight, how must the division be made?